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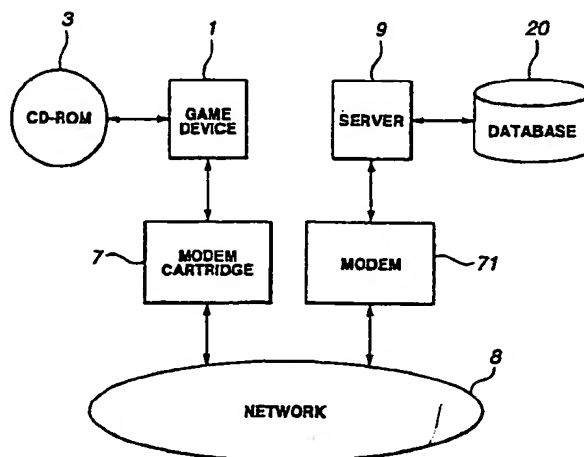
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(54) INFORMATION PROCESSOR, INFORMATION PROCESSING METHOD, INFORMATION RECORDED MEDIUM, AND INFORMATION PROCESSING SYSTEM

(57) The object of the present invention is to implement, by a simple arrangement, means for making the same information recording medium function selectively as a product version or as a demo version, and to provide a method of information processing whereby illicit use by a third party can be prevented. In a method of information processing according to the present invention, game software (a CD ROM) on which a game program is stored is inserted into a game device (step A1), and the content of back-up memory is read (step A2). A determination is made as to whether or not license information is written in the back-up memory (step A3) and, if no license information is written therein, the game software is made to function as the demo version (step A8). If license information is written therein, license checking is performed (step A4) and, as a result of the checking, the game software is made to function as the product version or as the demo version (steps A6, A7).

FIG.7



Description

TECHNICAL FIELD

5 [0001] The present invention relates to information processing devices such as games devices. In particular, it relates to a security system whereby means for altering (for example so as to cause the same information recording medium to selectively function as a demo version or as the product version) under prescribed conditions the processing content of a program stored on an information recording medium, such as game software, can be implemented by a simple construction and illicit use by a third party can be effectively prevented.

10 BACKGROUND ART

[0002] Game software used in game devices is distributed in the market by being recorded on portable information recording media such as for example CD ROMs or game cartridges. Such game software may comprise a regular product version which the user uses by obtaining a license from the licensor and a demo version (sample version) with the object of introducing an outline of the game to the user, subject to restrictions on some of the processing content of the game. By introducing such a demo version on the market, it is made possible for the user to try out the demo version of the game software, and, if he likes this, to obtain a license from the licensor so as to be able to enjoy the regular product.

15 [0003] However, since, conventionally, the demo version was prepared separately apart from the regular product version, it was necessary to manufacture two types of information recording medium in respect of the same game software. This meant that a large amount of storage space was required for the product, increasing production costs. Also, since it was necessary to stock two types of product, namely, the product version and demo version, there were problems such as that it took time before a user could be supplied with the product version after purchasing the demo version. In view of these circumstances, it was desired to realize means for making it the same game software function selectively as a product version or as a demo version. In such cases, in particular, it was desired to realize means for effectively preventing the game software from being used as the product version by illicit use by a third party.

20 [0004] Also, the present applicants, in Laid-open Japanese Patent Publication No. H. 11-53183, proposed a technique for altering the setting of processing content of a game program in accordance with the results obtained by ascertaining whether the game recording medium was being employed in the user's own game device or was being employed in another game device. By such a technique, since it becomes possible to produce a difference in the operating environment by differentiating game recording media employed in the user's own game device from game recording media employed in other game devices, the value of a game recording medium employed solely in the user's own game device can be raised.

25 [0005] However, with this technique, in order to ascertain whether or not the game recording medium was being used in the user's own game device, a writable region was provided on the game recording medium, and the aforesaid decision processing was performed by writing identification information (for example an ID number) of the recording medium in this region. This technique therefore could not be applied to read-only media such as CD ROMs or DVD ROMs, owing to the difficulty of providing a writable region. Furthermore, with this prior art technique, there was the risk that the identification information written on the game recording medium might be rewritten by illicit means to enable its use on another game device.

DISCLOSURE OF THE INVENTION

40 [0006] Accordingly, a first object of the present invention is to provide an information processing device, information processing method and information recording medium with a simple arrangement whereby the processing content of a prescribed program stored on the same information recording medium can be altered under prescribed conditions.

45 [0007] Also, a second object is to provide an information processing device, information processing method and information recording medium whereby illicit use by a third party can be prevented.

[0008] Furthermore, a third object of the present invention is to provide an information processing system, that, without providing a writable region on an information recording medium, can decide whether or not software recorded on the information recording medium was processed by a user's own information processing terminal and that can realize by a simple arrangement means for varying the processing content of the software in accordance with the result of this decision and an information processing terminal and server that can be applied to this information processing system.

50 [0009] Furthermore, a fourth object is to provide an information recording medium on which is recorded a procedure to make a computer function as an information processing terminal or server as aforesaid.

55 [0010] The first object of the present invention is solved by an information processing device comprising: first means for storage that stores first identification information that is individual to the information processing device; means for reading second identification information that is individual to the information recording medium; second means for storage that stores prescribed information including operation restriction of the information recording medium, third identification information individual to some information processing device, and fourth identification information individual to some information recording medium; and means for restricting the operation

content of the information recording medium when the first identification information and the third identification information coincide and the second identification information and the fourth identification information coincide, in accordance with the prescribed information; and for restricting the operation content of the information recording medium under a predetermined condition when the first identification information and said third identification information do not coincide or the second identification information and the fourth identification information do not coincide. In particular, the prescribed information including operation restrictions of the information recording medium may be information specifying period of use or conditions of use etc. of the information recording medium (hereinbelow in this specification called "license content information").

[0011] With such an arrangement, the information including license content information, third identification information and fourth identification information (hereinbelow in this specification called "license information") is supplied from the licensor to the user. This license information is stored on a suitable recording medium such as for example a portable storage medium such as back-up memory.

[0012] When an information processing device according to the present invention executes a prescribed program (for example a game program) that is recorded on an information recording medium, it determines in accordance with a prescribed algorithm whether or not the information recording medium is one for which a license has been granted (hereinbelow in this specification this is called "license checking"). If, as a result of the license checking, it is determined that the information recording medium is one for which a license has been granted, the information processing device can function to perform information processing of the information recording medium as a product version; if it is determined that the information recording medium is one for which a license has not been granted, it can function to perform information processing of the same information recording medium selectively as the product version or as a demo version, by subjecting the program that is stored on the information recording medium to prescribed restrictions.

[0013] The second object of the present invention is solved by sending license information to the information processing device through a communication circuit from a prescribed terminal device. In particular, preferably the license information is encrypted before being sent. With such an arrangement, illicit diversion of the license information by a third party can be prevented.

[0014] Also, the second means for recording may be a portable recording medium that is externally mounted with respect to the information processing device, such as for example back-up memory. By providing license information of each individual information recording medium on each individual portable recording medium, the need to store the license information in the information processing device is eliminated.

[0015] As a preferred mode of the present invention, the information recording medium stores a game program.

[0016] In an information processing method for achieving an object of the present invention, processing steps are executed performed in various means of an information processing device according to the present invention.

[0017] An information recording medium for achieving an object of the present invention stores a program whereby an information processing method according to the present invention is executed in an information processing device.

[0018] An information recording medium as referred to herein records information (for example a game program) in a recording region of the information recording medium by some physical means, and is capable of provoking the execution of prescribed functions such as for example a game program by an information processing device such as a game device. Also, the information that is recorded therein is not restricted to a game program but could be for example CD music data or LD video data etc. The essential is that it should be capable of downloading a program to a computer by some means so as to cause this to execute a prescribed function, or cause the computer to reproduce music data or video data.

[0019] For example an information recording medium may include a CD-R, game cartridge, floppy disk, magnetic tape, magneto-optic disc, CD ROM, DVD ROM, DVD RAM, ROM cartridge, RAM cartridge with a battery back-up, flash memory cartridge or non-volatile RAM cartridge etc.

[0020] It may also include a wired communication medium such as a telephone circuit, or communication medium such as a wireless communication medium such as a microwave circuit. The Internet is also included in communication media as referred to herein.

[0021] An information processing system according to the present invention for achieving the above third object comprises a plurality of information processing terminals that read prescribed software recorded on information recording media and execute this, and a server connected to said information processing terminals through a network and that manages the operating environment of processing at the information processing terminals, in which said server mutually associates and stores registration information including first identification information that is individually allocated to each information processing terminal, second identification information that is allocated beforehand to each type of software, and third identification information that is allocated to each said information recording medium in respect of software of the same type such that there is no overlap; said information processing terminal, on executing the software recorded on the information recording medium, transmits said first identification information and second identification information to the server and requests registration condition confirmation. When it has received said registration condition confirmation request, the server looks up the registration information, and, if a combination that has been sent from said information processing terminal of said first identification information and second identification information coincides with the registration information, sends to the information processing terminal a first checking result and sends a second checking result if said combination is not present. An information processing terminal that has received said first checking result executes said software under the ordinary operating environment, and an information processing terminal that has received the second checking result sends the third identification information and requests the server to register the third

identification information. After it has received this registration request, the server looks up once more the registration condition and, if the third identification information that has been transmitted from the information processing terminal is not associated and registered in respect of any other information processing terminal, associates and registers this third identification information with said information processing terminal, and sends a first registration result to the information processing terminal; and, if the third identification information is associated and registered in respect of any other information processing terminal, or if there is abnormality in at least any one of the first information, second identification information or third identification information (such as for example where there is suspicion that these items of identification information have been input by illicit means or where the number of times of input of the identification information is more than necessary), sends a second registration result to the information processing terminal. After it has received the first registration result, the information processing terminal executes said software under the ordinary operating environment, and, after it has received said second registration result, said information processing terminal executes the software under a restricted operating environment.

[0022] With such a convenient arrangement, even without providing a writable region in the information recording medium, it is possible to determine whether or not the software that is recorded on the information recording medium was processed by the user's own information processing terminal, and to alter the content of software processing in accordance with the result of this determination. In particular, since the registration information of all the information processing terminals is managed by the server, illicit actions relying on falsifying the identification information etc. can be prevented, and the setting of the operating environment at each information processing terminal can be altered by rewriting the registration information.

[0023] In a preferred mode of the present invention, the information processing terminal reads the software that is recorded on the information recording medium and, when it executes this, transmits first identification information, second identification information and third identification information to the server and requests confirmation of the registration condition. When it has received the registration condition confirmation request, the server looks up the registration information, and, if a combination that has been sent from said information processing terminal of said first identification information and second identification information coincides with the registration information, sends to said information processing terminal a checking result to that effect and if said combination is not present, if said third identification information is not associated and registered in respect of any other information processing terminal, associates and registers this third identification information with this information processing terminal, and sends a first registration result to the information processing terminal; and, if the third identification information is associated and registered in respect of any other information processing terminal, or if there is abnormality in at least any one of the first information, second identification information or third identification information, sends a second registration result to the information processing terminal. After it has received said checking result or first registration result, the information processing terminal executes said software under the ordinary operating environment, and, after it has received said second registration result, said information processing terminal executes said software under a restricted operating environment.

[0024] In the example described above, it was arranged for processing as a registered user (execution of the software under the ordinary operating environment) to be performed when the first identification information and second identification information agreed; however, it could be arranged for processing as a registered user to be performed if all of the first identification information, second identification information and third identification information agree. With such an arrangement, it is possible to ascertain positively and accurately whether or not the software is being used solely in the user's own information processing terminal.

[0025] It may be arranged for the information processing terminal, when sending the third identification information to the server, to read this third identification information stored beforehand in external memory, and to send this to the server.

[0026] With an information processing terminal according to the present invention that achieves the above third object and that reads and executes prescribed software recorded on an information recording medium, registration information including first identification information allocated individually to the information processing terminal, second identification information allocated beforehand to each type of software, and third identification information allocated to each said information recording medium in respect of software of the same type such that there is no overlap is mutually associated and stored, and when the software is executed the first identification information and second identification information are sent and a registration condition confirmation request is made to a server connected to this information processing terminal through a network. If a checking result is received to the effect that the combination of the first identification information and second identification information coincides with registration information managed by the server, said software is executed under the ordinary operating environment; if a checking result is received to the effect that this combination does not exist, third identification information is sent and a registration request of the third identification information is made to the server. If a registration result to the effect that registration was performed correctly is received, said software is executed under the ordinary operating environment, but, if registration was not performed correctly, said software is executed under a restricted operating environment.

[0027] In a preferred mode of the present invention, an information processing terminal, when it executes said software, sends first identification information, second identification information, and third identification information and makes a registration condition confirmation request to a server connected thereto through a network. If a checking result is received to the effect that the combination of said first identification information, second identification information and third identification information coincides with registration information managed by

the server, said software is executed under the ordinary operating environment; if a registration result is received to the effect that, the third identification information being unregistered in respect of any information processing terminal, registration of this third identification information was performed correctly, said software is executed under the ordinary operating environment, but, if a registration result is received to the effect that said registration was not performed correctly, said software is executed under a restricted operating environment.

[0028] A server according to the present invention which achieves the third object is connected through a network with a plurality of information processing terminals that read prescribed software that is recorded on an information recording medium and execute this, and manages the operating environment of processing at these information processing terminals; it mutually associates and stores registration information including first identification information individually allocated to each information processing terminal, second identification information allocated beforehand to each type of software, and third identification information allocated to each said information recording medium in respect of software of the same type such that there is no overlap; and it receives a registration condition confirmation request including said first identification information and second identification information sent to this server by said information processing terminal as a processing step prior to execution of the software. As a result of looking up the registration information, it transmits a first checking result to the effect that said software is to be executed under the ordinary operating environment to the information processing terminal, if the combination of said first identification information and second identification information that is sent from said information processing terminal coincides with registration information; if this combination does not exist, it sends to said information processing terminal a second checking result seeking the registration of third identification information in respect of said information processing terminal. If a registration request for this identification information is received together with said third identification information, it again looks up the registration condition, and, if said third identification information that was sent from the information processing terminal is not associated and registered in respect of any other information processing terminal, associates and registers this third identification information with this information processing terminal and sends a first registration result to this information processing terminal to the effect that the software is to be executed under the ordinary operating environment; and, if said third identification information is associated and registered in respect of some other information processing terminal, or if at least any one of said first identification information, second identification information or third identification information contains abnormality, sends to the information processing terminal a second registration result to the effect that said software is to be executed under a restricted operating environment.

[0029] As a preferred mode of the present invention, a server receives a registration condition confirmation request including first identification information, second identification information and third identification information sent to this server by an information processing terminal as a processing step prior to execution of the software; as a result of looking up said registration information, it transmits a checking result to the effect that said software is to be executed under the ordinary operating environment to said information processing terminal, if the combination of said first identification information, second identification information and third identification information that is sent from said information processing terminal coincides with registration information; if this combination does not exist, if said third identification information is not associated and registered in respect of any other information processing terminal, it associates and registers this third identification information with this information processing terminal and sends a first registration result to said information processing terminal to the effect that the software is to be executed under the ordinary operating environment; and, if said third identification information is associated and registered in respect of some other information processing terminal, or if at least any one of said first identification information, second identification information or third identification information contains abnormality, it sends to said information processing terminal a second registration result to the effect that said software is to be executed under a restricted operating environment.

[0030] A recording medium according to the present invention for achieving the above fourth object is a recording medium for a terminal or a recording medium for a server on which is recorded a procedure to cause a computer to function as an information processing terminal or as a server according to the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0031]

Figure 1 is a functional block diagram of a game device according to an embodiment;

Figure 2 is a detailed functional block diagram of a game device according to an embodiment;

Figure 3 is a view given in explanation of generation of license information;

Figure 4 is a view or given in explanation of restoration of license information;

Figure 5 is an overall flow chart of when license checking is performed;

Figure 6 is a flow chart of license checking;

Figure 7 is a layout diagram of a complete information processing system;

Figure 8 is a table of registration information managed by a server;

Figure 9 is a flow chart showing processing procedures of the game device and the server;

Figure 10 is a flow chart showing processing procedures of the game device and the server; and

Figure 11 is a flow chart showing processing procedures of the game device and the server.

PREFERRED EMBODIMENT OF THE INVENTION

Embodiment 1

[0032] This embodiment relates to a technique whereby prescribed program processing content that is stored on the same information recording medium is changed as a result of license checking (for example, the processing content is changed so as to provide either a product version or a demo version). This embodiment is described below with reference to Figure 1 to Figure 6.

[Construction of the game device]

[0033] The construction of a game device 1 is described in outline with reference to Figure 1. A game device 1 comprises: main CPU 101, RAM 102, ROM 103, CD I/F 180, cartridge I/Fs 1a, 1b, and PAT I/F 2a. When game device 1 is started up, an initial program for initialization processing that is stored on ROM 103 is started up. Also, an ID memory region 103a is secured in a prescribed recording region in ROM 103. In ID memory region 103a, there is stored identification information of game device 1 (for example, characteristic information of game device 1, such as its serial number). Main CPU 101 is connected to RAM 102 and ROM 103 through internal bus 105, and performs various control operations and/or calculation processing etc. Also, main CPU 101 reads and executes a program that is stored on CD ROM 3 through CD I/F 180 and internal bus 105. CD I/F 180 is the I/O interface of CD ROM 3. Main CPU 101 employs RAM 102 as a work area, and executes a game program in accordance with input data supplied from a control pad 2b through PAD I/F 28. The role in this embodiment of back-up memory 4 and modem cartridge 7 will be described later.

[0034] Next, the construction of game device 1 will be described in detail with reference to Figure 2. Game device 1 is constituted by CPU block 10 that performs control of the game device 1 as a whole, video block 11 that performs display control of the game screen, sound block 12 that generates effects sounds etc., and sub-system 13 that performs reading of CD ROM 3, etc.

[0035] CPU block 10 comprises an SCU (System Control Unit) 100, main CPU 101, RAM 102, ROM 103, cartridge I/F 1a, sub CPU 104, and CPU bus 105 etc.

[0036] Main CPU 101 exercises control over the device as a whole. This main CPU 101 is provided internally with a calculation function identical with a DSP (Digital Signal Processor), so that it can execute application software at high speed. RAM 102 is employed as a working area of main CPU 101. ROM 103 is divided into an ID memory region 103a described in Figure 1 and a region in which is stored an initial program for initialization processing and/or a program for executing various other types of control.

[0037] SCU 100 controls buses 105, 106 and 107 so as to perform data input/output between main CPU 101, VDPs 120, 130, DSP 140 and CPU 141 etc. in a smooth manner. Also, SCU 100 is provided in its interior with a DMA controller that is capable of transferring to a VRAM in video block 11 sprite data in the game. In this way, application software of a game etc. can be executed at high speed. Bus 106 is connected to cartridge I/Fs 1a, 1b. Modem cartridge 7 is connected to cartridge I/F 1a, and thereby acquires license information from host terminal 6 at the licenser end. The license information is stored in back-up memory 4 through cartridge I/F 1b under the control of SCU 100.

[0038] Apart from a "+" key, control pad 2b is provided with keys A B C and X Y Z. Sub CPU 104 is called an SMPC (System Manager & Peripheral Control) and is provided with functions including that of collecting output data such as A B C keys from control pad 2b through PAD I/F 2a in response to requests from main CPU 101.

[0039] It should be noted that not just a control pad 2b but any desired peripheral including for example a joystick or a keyboard could be connected to PAT I/F 2a. Also, sub CPU 104 is provided with a function of automatically recognizing the type of peripheral connected to PAT I/F 2a (main unit terminal) and of collecting peripheral data etc. by a communication system dependent on the type of peripheral.

[0040] Video block 11 comprises a VDP (Video Display Processor) 120 that performs the drawing of characters etc. consisting of polygon data of a video game, and a VDP 130 that performs drawing of a background screen and synthesis and clipping processing of polygon image data and background images. VDP 120 is connected to VRAM 131 and frame buffers 122, 123. Polygon drawing data representing the characters of the video game device is sent from main CPU 101 through SCU 100 to VDP 120, and is written in VRAM 121. The drawing data that is written in VRAM 121 is drawn to a frame buffer 122 or 123 for drawing in for example 16 bit/pixel form. The data of frame buffer 122 or 123 that is thus drawn is sent to VDP 130. Information to control the drawing is sent from main CPU 101 through SCU 100 to VDP 120. VDP 120 then executes drawing processing in accordance with these instructions.

[0041] VDP 130 is connected to VRAM 131 and has a construction whereby drawing data that is output from VDP 130 is output to encoder 160 through memory 132.

[0042] Encoder 160 generates a video signal by adding a synchronization signal etc. to this image data, and outputs this to television receiver 5.

[0043] Sound block 12 comprises a DSP 140 that performs audio synthesis in accordance with the PCM system or FM system, and a CPU 141 that performs control etc. of this DSP 140. The audio data that is generated by DSP 140 is converted to a 2-channel signal by D/A converter 170, before being output to speaker 5b.

[0044] Sub system 13 comprises a CD ROM drive 1b, CD I/F 180 F, CPU 181, MPEG AUDIO 182, and MPEG VIDEO 183 etc. This sub system 13 is equipped with functions to perform for example reading of application software supplied in the form of a CD ROM, and to perform reproduction of video. CD ROM drive 1b reads data from the CD ROM. CPU 181 performs control of the CD ROM drive 1b, and processing such as error correction of the data that is thus read. The data that is read from the CD ROM is supplied to main CPU 101 through CD I/F 180, bus 106, and SCU 100, and is utilized as application software. Also, MPEG AUDIO 182 and MPEG VIDEO 183 are devices that restore data that has been compressed in accordance with the MPEG (Motion Picture Expert Group) standard.

[0045] Video reproduction on television receiver 5 can be performed by performing restoration of the MPEG compressed data that is written in CD-R2 shown in Figure 1 using MPEG AUDIO 182 and MPEG VIDEO 183.

[Explanation of the operation of the game device]

[0046] Next, an explanation of the operation of game device 1 will be given. When the user inserts a CD ROM 3 attached to a magazine supplement or like that he has purchased in a game device 1 to use this, CD ROM 3 first of all functions as the demo version. If the game on CD ROM 3 of this demo version appeals to the user, so that he wishes to use the product version, he requests a license from the licensor. In this case, the user transmits to the licensor the characteristic serial number of game device 1 and the product number of the game software, so that the necessary approval can be given. Also, the period of use and the use conditions etc. of the game program (for example, if the game software is to function as the product version, restrictive conditions etc. in regard to game program processing) are determined in the form of an agreement. When this is done, license information is supplied from the licensor to the user. This license information includes information to the effect that a license for the game software is granted, and, in addition, information specifying the period of use of the game program and/or use conditions etc. (license content information). The period of use of the game program and/or the conditions of use on game device 1 are restricted in accordance with this license content information. Also, this license information is information that is uniquely determined from the combination of the identification information of game device 1 and the identification information of the game software; even if the game software is the same, different license information would be supplied to a different game device. In other words, the license information is different for each game device and is different for each game software.

[0047] The license information is stored in back-up memory 4 by operation of the user's control pad 2b. However, regarding the type of license information that exists, since this is determined by the number of combinations of game device 1 and CD ROM 3, the amount of such information may be very large. Consequently, apart from the user himself storing the license information in back-up memory 4 by operation of control pad 2b, data input may also be effected from the host terminal 6 of the licensor through a communication circuit and modem cartridge 7. Preferably, in the transmission of this license information, transmission is effected in encrypted fashion, in order to prevent illicit use by a third party. It is also possible for the user to send identification information of game device 1 and identification information of CD ROM 3 to the licensor through the control circuit. If this is done, the aforesaid identification information can be transmitted to the licensor without letting the user know the identification information, by encrypting these two items of identification information.

[0048] Back-up memory 4 may be utilized for saving game data, in addition to the license information.

[0049] Furthermore, CD ROM 3 may store beforehand, apart from the game program, a license information confirmation program. This license information confirmation program is a program for determining, based on the identification information of game device 1, identification information of CD ROM 3, and license information supplied by the licensor, whether CD ROM 3 is to function as the demo version or is to function as the product version. For example the serial number can be used as the identification information of game device 1. In this case, a numerical code of any desired number of digits could be used as the identification information, but, not restricted to this, a combination with any desired letter code could also be employed. The same applies to the identification information of CD ROM 3.

[0050] Next, a procedure for generating and decoding license information will be described with reference to Figure 3 and Figure 4. Figure 3 is a diagram of a procedure for generating license information using a public key encryption system and Figure 4 is a diagram of a procedure for decoding the license information and comparing it with a license.

(Procedure for generating license information)

[0051] As described above, the licensor who issues the license determines the license content such as the period of use and use conditions of the game program in the agreement with the user. The information of the license content (32-bit binary data) is defined in correspondence with this license content. The data format of the information of the license content is determined beforehand in a prescribed form, such as that for example the most significant

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bits 32 to 29 determine the period of use of the game program, while the remaining bits 28 to 1 determine the license content, such as the conditions of use of the game program.

[0052] In order to generate the license information, as shown in Figure 3, 96-bit information (hereinbelow called "combined information") is generated by combining identification information of game device 1 (32 bits), identification information of CD ROM 3 (32 bits) and information of license content (32 bits). This combined information could be directly sent to the user, but, preferably, in order to ensure secrecy of the license information, is sent in encrypted form. In this embodiment, the license information is obtained by encrypting the combined information using a secret key of an RSA encryption system (RSA crypto system). The license information which is thus obtained is transmitted to game device 1 through a communication circuit etc.

[0053] If the plain text of the combined information is represented by M and the cipher text of the license information is represented by C, a secret key and a public key can be found as follows.

[0054] Choosing two large prime numbers p and q, their product $n = pq$ is found. By choosing an integer e that is below $(p - 1)(q - 1)$ and is mutually prime with respect to $(p - 1)(q - 1)$, an integer d can be found that satisfies:

$$e \times d \equiv 1 \pmod{(p - 1)(q - 1)}$$

[0055] When this is done, (e, n) is a public key and (d, n) is a secret key.

[0056] In order to obtain the license information (cipher text C) by encrypting the combined information (plain text M) by the secret key, the calculation:

$$C = M^d \pmod{n}$$

is performed. On the other hand, in order to obtain the combined information (plain text M) by decoding the license information (cipher text C) by the public key, the calculation:

$$M = C^e \pmod{n}$$

is performed. In this embodiment, the public key is recorded beforehand in ROM 103 of game device 1 or on CD ROM 3, and the secret key is privately held by the licenser. In order to find the secret key from the public key, it would be necessary to find p and q by prime factor decomposition of n, but, in fact, p and q are determined to be a few hundred bits, so, since prime factor decomposition of such an enormous number is currently incapable of execution within a practicable time, it is practically impossible to find the secret key. Illicit diversion of the license information can thereby be effectively prevented.

(Procedure for restoration of the license information)

[0057] As shown in Figure 4, the license information is decoded by the public key which is recorded beforehand on ROM 103 of game device 1 or on CD ROM 3. The combined information is restored by this decoding. The identification information of game device 1 is stored in the most significant 96 to 65 bits of the restored combined information; the identification information of CD ROM 3 is stored in the middle 64 to 33 bits, and the information of the license content is stored in the least significant 32 to 1 bits. License checking is performed using these respective items of information.

(License checking procedure)

[0058] The license checking procedure is described with reference to Figure 5 and Figure 6. CD ROM 3 on which is stored the game software is inserted into game device 1 (step A1). Main CPU 101 detects the fact that CD ROM 3 has been inserted through CD I/F 180, and reads the content of back-up memory (step A2). It then ascertains whether or not license information has been written into a prescribed storage region of the back-up memory (step A3); if license information has been written therein (step A3: YES), it performs license checking (step A4). If, as a result of the license checking, it determines that this is to function as the product version (step A5: YES), main CPU 101 then causes CD ROM 3 to function as the product version (step A6).

[0059] The various processing steps of license checking in step A4 will now be described with reference to Figure 6. First of all, the identification information stored in ID memory region 103a of game device 1 and the identification information stored in the most significant 96 to 65 bits of the combined information restored by the public key are compared (step B1). Next, the identification information stored in a prescribed recording region of CD ROM 3 and the information stored in the intermediate 64 to 33 bits of the combined information are compared (step B2). Next, the license content information, which is stored in the least significant 32 to 1 bits of the combined information is read, and this is interpreted (step B3).

[0060] In step A5, a decision is made as follows on the basis of the results of execution of these processing steps (step B1 to step B3). If the identification information of game device 1 and the respective identification information of CD ROM 3 coincide, CD ROM 3 is made to function as the product version in accordance with the information of the license content. On the other hand, if the identification information of game device 1 and any of the items of identification information of CD ROM 3 do not coincide, or, if information to the effect that execution of the game program is restricted (information to the effect that this is to be made to function as a demo version) is written in the license content information, CD ROM 3 is made to function as demo version (1) (step A7: first restriction processing). As the content of this first restriction processing, there may be suitably set for example various restrictions concerning the number of stages of the game program, restrictions concerning the number of characters that appear, restrictions concerning the operation processing of the characters, or restrictions

regarding game time etc.

[0061] On the other hand, if no license information is written in back-up memory 4 (step A3: NO), main CPU 101 causes CD ROM 3 to function as the demo version (2) (step A8: second restriction processing). This second restriction processing is performed for example when the user has purchased CD ROM 3 and executes the game program by inserting this into game device 1 for the first time. Thus, the first restriction processing and second restriction processing could be different processing or could have the same processing content.

[0062] Apart from being stored in a prescribed storage region of CD ROM 3, the license information confirmation program may be stored in a prescribed storage region of ROM 103 for each game program.

[0063] Also, as the public key code, apart from RSA encryption, there could be employed McLeish encryption, utilizing the difficulty of code for error correction, Elgamel code utilizing the difficulty of logarithmic calculation in a remainder calculation etc., MI encryption utilizing the difficulty of solving multi-variable multi-dimensional simultaneous equations, or elliptic encryption etc. in which RSA encryption is reconstructed by using calculation defined on an elliptical curve.

[0064] Thus, as described above, with this embodiment, media on which identical information is recorded can be made to function as the product version in accordance with the license information or as the demo version; thus, there is no need to create a demo version separate from the product version, thereby enabling production costs to be lowered. Furthermore, from the point of view of the licensor, there is no need to distinguish the product version from the demo version in inventory management, so inventory management is simplified. Also, from the point of view of the user, there is the advantage that the demo version game software can be immediately used as the product version by acquiring the license information. There is therefore no need to wait for delivery of the product version.

[0065] Furthermore, since the license information is different for each game device and is different for each item of game software, it is possible to prevent illicit use of game software, since, even for the same game software item, its use can be prevented on a game device in respect of which a license has not been obtained. That is, illicit use by a third party using an illicit copy of the license information can be effectively prevented by employing license checking of the identification information of the game device.

[0066] Also, by writing license information in externally attached back-up memory, it is possible to allocate different back-up memory to different items of game software, so that the game software items can be used together in integrated fashion. In this way, there is no need for the game device to store license information for each item of game software, thereby making it possible to utilize hardware resources more effectively. In particular, this is effective when the license information comprises a large amount of data. Also, game data can be saved in free capacity of the back-up memory.

[0067] Also, secrecy of the identification information can be ensured by transmitting the identification information in encrypted form when the identification information of the game device and the game software is respectively transmitted to the licensor. Specifically, with this embodiment, a security system can be constructed that prevents illicit use of game software.

[0068] The information recording medium on which the game software is recorded is not restricted to being a CD ROM but may be for example a game cartridge, CD-R, DVD ROM, DVD RAM, ROM cartridge, magneto-optic discs, magnetic tape, or RAM cartridge with a battery back-up, flash memory cartridge, or non-volatile memory cartridge. Also, it could be a communication medium such as a wired communication medium such as a telephone circuit or a wireless communication medium such as a microwave circuit. The Internet is also included in communication media as referred to herein.

[0069] Also, although, in this embodiment, a game device has been described as an example of an information processing device, there is no restriction to game devices, and the design could be suitably modified for for example CD reproduction devices, LD reproduction devices, or video reproduction devices etc.

Embodiment 2.

[0070] This embodiment relates to a technique whereby, by utilizing a communication system, it is decided whether a game recording medium is being employed on the user's own game device or is being employed on another game device, and the setting of the content of game program processing is altered in accordance with the result of this decision. This is achieved by centralized management on a server of the correspondence relationship of the game device (information processing terminal) and the game program (i.e. the game program which is recorded on the game recording medium. This may also be simply referred to as the "software" or "application"). This embodiment is described below with reference to Figure 7 to Figure 11.

[0071] Figure 7 is a layout diagram of the entire information processing system (also referred to as "security system"). Game device 1 is connected to a server 9 through a modem cartridge 7 and network 8. A game device 1 and modem cartridge 7 are of the same construction as in the case of Embodiment 1. Network 8 is a communication network and may include a dedicated line such as an ISDN circuit or a public circuit. Server 9 is connected to network 8 by means of modem 71 and is arranged to be capable of connection with a plurality of game devices 1 through the same network. Also, a server 9 holds a large-capacity data base 20 and manages the operating environment of game devices 1 and furthermore sets their operating environments by deciding whether or not the game recording medium is being processed solely on the user's own game device, by using various registration information that is registered in database 20. The details of the registration information will be described later. Also, server 9 is capable of implementing the aforesaid decision in respect of the individual game devices 1 by communication with the plurality of game devices 1.

[0072] Game device 1 comprises internally a main CPU 101, RAM 102, ROM 103, CD I/F 180, and cartridge I/Fs 1a, 1b etc. A software ID and software SN (serial number) are allocated beforehand to the game program that is stored on CD ROM 3. In this specification, the "software ID" is defined as identification information that is allocated to each game title (each type of game software). For example, software ID "001011" may be allocated in respect of game A, while software ID "110010", ... may be allocated in respect of game B. Thus, even though the game recording medium may be different, if the game title is the same, the same game ID will be allocated. Also, the software SN is defined as identification information that is allocated to each game recording medium, for games of the same title. There will therefore exist a number of software SNs equal in number to the number of game recording media. For example, software SN "10110111" may be allocated to the game software recorded on game recording medium A while software SN "10111000", ..., is allocated to the game software stored on game recording medium B. Also, as already described with reference to Embodiment 1, individual identification information is stored on each game device 1 in ID memory region 103a of ROM 103 (in this embodiment, this is referred to as the game device ID). As these items of identification information, any desired letter code such as numerals, letters of the alphabet, or symbols could be employed.

[0073] As shown in Figure 8, in data base 20 of server 9, the software ID of the game program that was the subject of game execution processing in each game device and the software SN are mutually associated and registered in the form of a table. This table 21 is defined as the registration information. The registration information may be registered linked with play data in each game program. The "play data" means various types of setting information for when the user plays the game, such as for example information regarding the number of stages that the user has cleared, points acquired, or playing time etc.

[0074] Next, the processing steps of the present invention will be described with reference to Figure 9. This Figure shows the processing steps that are respectively performed by the game device and the server. When the power source of game device 1 is connected to start up the game device, game device 1 is connected with server 9 (step C1) by a pre-set procedure. Server 9 then enters registration information confirmation mode and goes into a condition waiting for external input. When connection is completed, game device 1 reads the game device ID from ID memory region 103a, and reads the software ID from the game recording medium. Also, it sends the game device ID and software ID to server 9 and makes a request for confirmation of the registration information (step C2). A request for confirmation of registration information means an inquiry of the server as to whether or not the game device ID and software ID coincide, so as to confirm whether the game program that is registered on the game recording medium is being used solely in respect of the user's own game device or is being used on another game device. Server 9 receives the game device ID and software ID (step D1), and checks these with the registration information that is registered in data base 20 (step D 2).

[0075] If, as a result of the checking it, it is found that the combination of the game device ID and software ID that is transmitted from game device 1 coincides with the registration information that is registered in data base 20 (step D3: YES), this checking result is transmitted to game device 1 (step D4), and registration information confirmation mode is terminated (step D5). On the other hand, if the combination of game device ID and software ID that is transmitted from game device 1 is not registered in data base 20 (step D3: NO), a checking result to that effect is transmitted to game device 1 (step D6).

[0076] When game device 1 receives the checking result that is transmitted from server 9 (step C3), it decides whether the game device ID and software ID are registered or are not registered (step C4). If they are registered i.e. if the user is a registered user (step C4: YES), game processing is performed under the ordinary operating environment (step C9).

[0077] In contrast, if it is not registered (step C4: NO), game device 1 requests the user to input the software SN, transmits this software SN that is thus input to server 9, and requests registration of the software SN (step C5). When server 9 receives the software SN (step D7), it registers this in data base 20 (step D8). When this is done, if the software SN cannot be properly registered, for a reason such as that the software SN is already registered in respect of another game device (step D9: NO), this registration result is transmitted to game device 1 (step D10), and registration information confirmation mode is terminated (step D11). On the other hand, if it proves possible to register the software SN correctly in the database (step D9: YES), the registration report to that effect is transmitted to game device 1 (step D 12), and registration information confirmation mode is terminated (step D 13).

[0078] When game device 1 receives the registration result that is transmitted from server 9 (step C6), it decides whether registration has been performed correctly or not (step C7). If registration has been correctly performed i.e. if the user is a newly registered user (step C7: YES), game processing is performed under the operating environment that is set beforehand for newly registered users (step C10). Game processing under art operating environment that is set for newly registered users may include for example display on the screen of a message to the effect that a new registration has been performed; or processing to display messages to the effect that if a game recording medium used in another game device is employed in the user's own game device, the operating environment settings may be altered, or to urge caution in that the game must not be played by obtaining a software SN etc. by illicit means. Of course, such processing could be dispensed with, and the same processing as in the case of ordinary game processing (step C9) could be performed.

[0079] In contrast, when registration has not been performed correctly (step C7: NO), game processing is conducted under the restricted operating environment (step C8). A restricted operating environment means for example that setting is effected such that the number of game stages is decreased, effects sounds are eliminated, operation of the player characters is slowed down, or the playing time is shortened, ..., etc. Also, as a restricted game, it may be arranged for a previously prepared demo version of the game to be executed.

[0080] Consequently, according to the present invention, since it is possible to decide, by using a server to manage registration information of all the game devices, whether the game recording medium is being employed in the user's own game device or is being employed in another game device, it is possible to prevent processing, by illicit means such as rewriting the identification information, whereby a game recording medium that was employed in another game device is employed as if it were used solely in the user's own game device. In particular, whereas, with the technique of Laid-open Japanese Patent Publication No. H. 11-53183, management of the game recording media must be performed individually, making control of illicit actions difficult, with the present invention, thanks to the use of registration information accumulated in a data base, control of all the game recording media can easily be performed.

[0081] Also, when the user uses a new game program, the game device ID and software ID and software SN are automatically associated and registered, so if a third party employs a game device that had been used in another user's game device in his own game device, the registration information will not coincide at the server end, so the operating environment of the game can be made to be restricted.

[0082] Furthermore, little trouble is required in the event of redistribution in the market of so-called second-hand products, since it suffices simply to rewrite the registration information registered in the data base, or to issue a fresh software SN. It is also possible to collect a fee from the user to rewrite the registration information.

[0083] Also, although, in the above description, the game device ID was employed as the identification information of the game device, any identification information allocated to each user which is mutually different between users could be employed such as for example a user ID (user's individual number) issued by the server manager, or even a telephone number.

[0084] It should be noted that, although, in the above examples, when the registration information of the database was checked, game device 1 sent only the game device ID and software ID to server 9, it could be arranged for the transmission to include simultaneously the software SN. Figure 10 shows the respective processing steps executed by game device 1 and server 9 in these circumstances. The basic processing steps are the same as the processing steps shown in Figure 9. When the game device 1 is started up, connection to server 9 is effected (step E1) by a predetermined procedure. Then, the game device ID, software ID and software SN are sent to server 9 and registration information confirmation is requested (step E2). For the software SN, that directly input by the user when game device 1 was started up is employed. Server 9 receives the game device ID, software ID and software SN (step F1) and checks the database (step F2). When checking data base 20, it would be satisfactory to simply check the game device ID and software ID as described in the previous embodiment, but it is also possible to effect look-up and checking using a combination of game device ID, software ID and software SN. If, as a result of the checking, it is found that the software ID and software SN of the game recording medium agree with the combination of game device ID (step F3: YES), this checking result is sent to game device 1 (step F6), and the registration condition confirmation mode terminates normally (step F 9).

[0085] On the other hand, if the software ID or software SN is unregistered in respect of the game device ID (step F3: NO), this is registered in database 20 (step F4). If the software S is not associated and registered in respect of any other game device (step F5: YES), the software SN is then associated and registered with the game device 1 in question, and this registration result is transmitted to game device 1 (step F7). If, because of a reason such as that the software SN has been associated and registered in respect of any other game device, correct registration of the software SN cannot be achieved (step F5: NO), this registration result is sent to game device 1 (step F8), and the registration information confirmation mode is terminated (step F10).

[0086] When game device 1 receives the checking result or registration result from server 9 (step E3), it evaluates this checking result or registration result. If the combination of game ID, software ID and software SN agrees i.e. if the user is a registered user (step E4: YES), ordinary game processing is performed (step E5). On the other hand, in the case of an unregistered user (step E4: NO), if registration of the software SN is performed normally i.e. in the case of a newly registered user (step E6: YES), game processing is performed under the operating environment that is set beforehand for newly registered users (step E7). Game processing under the operating environment that is set for newly registered users is the same as described above, but could be identical with that of ordinary game processing (step E5).

[0087] Also, if the software SN cannot be associated and registered with the game device ID of the user's game device (step E6: NO), due to reasons such as the user not being registered (step E4: NO), the software SN being registered to another game device, or suspicion that the software SN has been input by illicit means (where the number of times of input of the software SN is more than necessary) etc., game processing is performed under the restricted operating environment (step E8).

[0088] Although, in the above description, in the processing step of the game device 1, the software SN that was input by the user was employed in transmission of the software SN to server 9, it would be possible to arrange for the software SN, software ID and game device ID to be stored beforehand in back-up memory, these being then read by game device 1 and transmitted to server 9. The processing step of game device 1 in this case is shown in Figure 11. When the game device 1 is started up, game device 1 checks back-up memory 4 (step G1). If the game device ID, software ID and software SN are not written therein (step G2: NO), game device 1 writes the game device ID, software ID and software SN in back-up memory 4 (step G3) and connects to server 9 (step G4). And if the game device ID, software ID and software SN are written therein (step G2: YES), connection is effected to server 9 (step G4). When connection to server 9 is completed, the data in back-up memory 4 (game device ID, software ID and software SN) are sent to server 9, and a request for registration information confirmation is made (step G5). Subsequently, the processing of step E3 to step E6 of Figure 10 is executed.

[0089] When the game device ID, software ID and software SN are transmitted from the game device to the server, the construction may be such that transmission of these items of identification information is effected in pre-encoded form using RSA encryption, McLeish encryption, Elgamel coding, or MI encryption.

[0090] Also, although, in this embodiment, a game device was described as an example of an information processing terminal, this could be applied not merely to game devices but also to CD reproduction devices, LD reproduction devices, or video reproduction devices etc., by making suitable design modifications.

INDUSTRIAL APPLICABILITY

[0091] With the information processing device and information processing method according to the present invention, it is possible to alter the processing content of a program that is stored on the same information recording medium by a simple arrangement. Consequently, there is no need to manufacture information recording media for each function, thereby making it possible to lower production costs. Also, illicit use of the information recording media by third parties can be effectively prevented.

[0092] Furthermore, with an information processing system, information processing terminal and server according to the present invention, by a simple arrangement, it is possible to ascertain whether or not the software that is recorded on the information recording medium is being processed by the user's own information processing terminal, and to alter the content of processing of the software in accordance with the result that is thus found. In particular, since the registration information of all the information processing terminals is managed by the server, it is possible to prevent illicit actions by tampering etc. with the identification information, and it is possible to alter the setting of the operating environment at each information processing terminal by for example rewriting the registration information.

[0093] Also, with a recording medium for a terminal or recording medium for a server according to the present invention, a computer can be made to function as an information processing terminal or server according to the present invention.

Claims

1. An information processing device that reads information recorded on an information recording medium and performs prescribed information processing, comprising:

first means for storage that stores first identification information that is individual to said information processing device;

means for reading second identification information that is individual to said information recording medium;

second means for storage that stores prescribed information including operation restriction of said information recording medium, third identification information individual to some information processing device, and fourth identification information individual to some information recording medium; and

means for restricting the operation content of said information recording medium when said first identification information and said third identification information coincide and said second identification information and said fourth identification information coincide, in accordance with said prescribed information; and for restricting the operation content of said information recording medium under a predetermined condition when said first identification information and said third identification information do not coincide or said second identification information and said fourth identification information do not coincide.

2. The information processing device of claim 1 wherein said prescribed information is information that determines the period of use or condition of use etc. of said information recording medium.

3. The information processing device of claim 1 or claim 2 wherein said prescribed information, said third identification information and said fourth identification information are sent to said information processing device from a prescribed terminal device through a communication circuit.

4. The information processing device of claim 3 wherein said prescribed information, said third identification information and said fourth identification information are sent to said information processing device in encrypted form.

5. The information processing device of any of claims 1 to 4 wherein said second means for storage is a portable recording medium externally mounted on said information processing device.

6. The information processing device of claim 5 wherein said externally mounted portable recording medium is back-up memory.

7. The information processing device of any of claims 1 to 6 wherein said information recording medium is an information recording medium on which a game program is stored.
8. An information processing method for reading information stored on an information recording medium and performing prescribed information processing, comprising the steps of:

storing the first identification information individual to said information processing device;

reading second identification information individual to said information storage medium;

storing prescribed information including an operation restriction of said information recording medium, third identification information individual to some information processing device, and fourth identification information individual to some information recording medium; and

restricting the operation content of said information recording medium when said first identification information and said third identification information coincide and said second identification information and said fourth identification information coincide, in accordance with said prescribed information; and restricting the operation content of said information recording medium under a predetermined condition when said first identification information and said third identification information do not coincide or said second identification information and said fourth identification information do not coincide.

9. The information processing method of claim 8 wherein said prescribed information is information determining the period of use or condition of use etc. of said information recording medium.

10. The information processing method of claim 8 or claim 9 wherein said prescribed information, said third identification information and said fourth identification information are sent to said information processing device from a prescribed terminal device through a communication circuit.

11. The information processing method of claim 10 wherein said prescribed information, said third identification information and said fourth identification information are sent to said information processing device in encrypted form.

12. The information processing method of any one of claim 8 to claim 11 wherein said second means for storage is a portable recording medium externally mounted on said information processing device.

13. The information processing method of claim 12 wherein said externally mounted portable recording medium is back-up memory.

14. The information processing method of any one of claim 8 to claim 13 wherein said information recording medium is an information recording medium on which a game program is stored.

15. An information recording medium capable of being read by a computer wherein is stored a program to cause the computer to execute an information processing method of claim 8.

16. The information recording medium of claim 15 wherein said prescribed information is information determining the period of use or condition of use etc. of said information recording medium.

17. The information recording medium of claim 15 or claim 16 wherein a game program is recorded in a prescribed recording region.

18. An information processing system comprising a plurality of information processing terminals that read prescribed software recorded on information recording media and execute this, and a server connected to said information processing terminals through a network and that manages the operating environment of processing at the information processing terminals, in which

said server mutually associates and stores registration information including first identification information that is individually allocated to each information processing terminal, second identification information that is allocated beforehand to each type of software, and third identification information that is allocated to each said information recording medium in respect of software of the same type such that there is no overlap;

said information processing terminal, on executing the software recorded on said information recording medium, transmits said first identification information and second identification information to the server and requests registration condition confirmation;

upon receiving said registration condition confirmation request, the server looks up the registration information, and, if a combination that has been sent from said information processing terminal of said first identification information and second identification information coincides with the registration information, sends to said information processing terminal a first checking result and sends a second checking result if said combination is not present;

an information processing terminal that has received said first checking result executes said software under the ordinary operating environment, and an information processing terminal that has received said second checking result sends said third identification information and requests the server to register the third identification information;

upon receiving this registration request, the server looks up once more the registration condition and, if said third identification information that has been transmitted from the information processing terminal is not associated and registered in respect of any other information processing terminal, associates and registers this third identification information with said information processing terminal, and sends a first registration result to said information processing terminal; and, if said third identification information is associated and registered in respect of any other information processing terminal, or if there is abnormality in at least any one of first information, second identification information or third identification information, sends a second registration result to said information processing terminal; and

said information processing terminal, which has received the first registration result executes said software under the ordinary operating environment, and said information processing terminal, which has received said second registration result, executes said software under a restricted operating environment.

19. An information processing system comprising a plurality of information processing terminals that read prescribed software recorded on information recording media and execute this, and a server connected to said information processing terminals through a network and that manages the operating environment of processing at the information processing terminals, in which

said server mutually associates and stores registration information including first identification information that is individually allocated to each information processing terminal, second identification information that is allocated beforehand to each type of software, and third identification information that is allocated to each said information recording medium in respect of software of the same type such that there is no overlap;

said information processing terminal, on executing the software recorded on said information recording medium, transmits said first identification information, second identification information and third identification information to the server and requests registration condition confirmation;

upon receiving said registration condition confirmation request, the server looks up the registration information, and, if a combination that has been sent from said information processing terminal of said first identification information and second identification information coincides with the registration information, sends to said information processing terminal a checking result to that effect and if said combination is not present, if said third identification information is not associated and registered in respect of any other information processing terminal, associates and registers this third identification information with said information processing terminal, and sends a first registration result to said information processing terminal; and, if said third identification information is associated and registered in respect of any other information processing terminal, or if there is abnormality in at least any one of first information, second identification information or third identification information, sends a second registration result to said information processing terminal; and

after it has said information processing terminal, which has received said checking result or first registration result, executes said software under the ordinary operating environment, and said information processing terminal, which has received said second registration result, executes said software under a restricted operating environment.

20. The information processing system of claim 18 or claim 19 wherein said information processing terminal, when it sends said third identification information to the server, reads this third identification information that has been stored beforehand in external memory, and sends this to the server.

21. An information processing terminal that reads and executes prescribed software recorded on an information recording medium wherein, as a processing step prior to execution of said software, registration information including first identification information allocated individually to the information processing terminal, second identification information allocated beforehand to each type of software, and third identification information

allocated to each said information recording medium in respect of software of the same type such that there is no overlap is mutually associated and stored, and said first identification information and second identification information are sent and a registration condition confirmation request is made to a server connected to this information processing terminal through a network,

if a checking result is received to the effect that the combination of said first identification information and second identification information coincides with registration information managed by the server, said software is executed under the ordinary operating environment,

if a checking result is received to the effect that this combination does not exist, third identification information is sent and a registration request of the third identification information is made to the server, and

if a registration result to the effect that registration was performed correctly is received, said software is executed under the ordinary operating environment, but, if registration was not performed correctly, said software is executed under a restricted operating environment.

22. An information processing terminal that reads and executes prescribed software recorded on an information recording medium wherein, as a processing step prior to execution of said software, registration information including first identification information allocated individually to the information processing terminal, second identification information allocated beforehand to each type of software, and third identification information allocated to each said information recording medium in respect of software of the same type such that there is no overlap is mutually associated and stored, and said first identification information, second identification information and third identification information are sent and a registration condition confirmation request is made to a server connected to this information processing terminal through a network,

if a checking result is received to the effect that the combination of said first identification information and second identification information coincides with registration information managed by the server, said software is executed under the ordinary operating environment,

if a registration result is received to the effect that, the third identification information being unregistered in respect of any information processing terminal, registration of this third identification information was performed correctly, said software is executed under the ordinary operating environment, but, if a registration result is received to the effect that said registration was not performed correctly, said software is executed under a restricted operating environment.

23. A server which is connected through a network with a plurality of information processing terminals that read prescribed software that is recorded on an information recording medium and execute this, and that manages the operating environment of processing at these information processing terminals;

which mutually associates and stores registration information including first identification information allocated individually to each information processing terminal, second identification information allocated beforehand to each type of software, and third identification information allocated to each said information recording medium in respect of software of the same type such that there is no overlap;

which receives a registration condition confirmation request including said first identification information and second identification information sent to this server by said information processing terminal as a processing step prior to execution of the software;

which, as a result of looking up said registration information, transmits a first checking result to the effect that said software is to be executed under the ordinary operating environment to said information processing terminal, if the combination of said first identification information and second identification information that is sent from said information processing terminal coincides with registration information;

which, if this combination does not exist, sends to said information processing terminal a second checking result seeking the registration of third identification information in respect of said information processing terminal;

which, if a registration request for this identification information is received together with said third identification information, again looks up the registration condition, and, if said third identification information that was sent from the information processing terminal is not associated and registered in respect of any other information processing terminal, associates and registers this third identification information with this information processing terminal and sends a first registration result to said information processing terminal to the effect that the software is to be executed under the ordinary operating environment; and

5 which, if said third identification information is associated and registered in respect of some other information processing terminal, or if at least any one of said first identification information, second identification information or third identification information contains abnormality, sends to said information processing terminal a second registration result to the effect that said software is to be executed under a restricted operating environment.

- 10 24. A server which is connected through a network with a plurality of information processing terminals that read prescribed software that is recorded on an information recording medium and execute this, and that manages the operating environment of processing at these information processing terminals;

15 which mutually associates and stores registration information including first identification information individually allocated to each information processing terminal, second identification information allocated beforehand to each type of software, and third identification information allocated to each said information recording medium in respect of software of the same type such that there is no overlap;

20 which receives a registration condition confirmation request including said first identification information, second identification information and third identification information sent to this server by said information processing terminal as a processing step prior to execution of the software;

25 which, as a result of looking up said registration information, transmits a checking result to the effect that said software is to be executed under the ordinary operating environment to said information processing terminal, if the combination of said first identification information, second identification information and third identification information that is sent from said information processing terminal coincides with registration information;

30 which, if this combination does not exist, if said third identification information is not associated and registered in respect of any other information processing terminal, associates and registers this third identification information with this information processing terminal and sends a first registration result to said information processing terminal to the effect that the software is to be executed under the ordinary operating environment; and

35 which, if said third identification information is associated and registered in respect of some other information processing terminal, or if at least any one of said first identification information, a second identification information or third identification information contains abnormality, sends to said information processing terminal a second registration result to the effect that said software is to be executed under a restricted operating environment.

- 40 25. A recording medium for a terminal on which is recorded a procedure to cause a computer to function as an information processing terminal according to claim 21 or claim 22.

- 45 26. A recording medium for a server on which is recorded a procedure to cause a computer to function as a server according to claim 23 or claim 24.
- 50
- 55

FIG.1

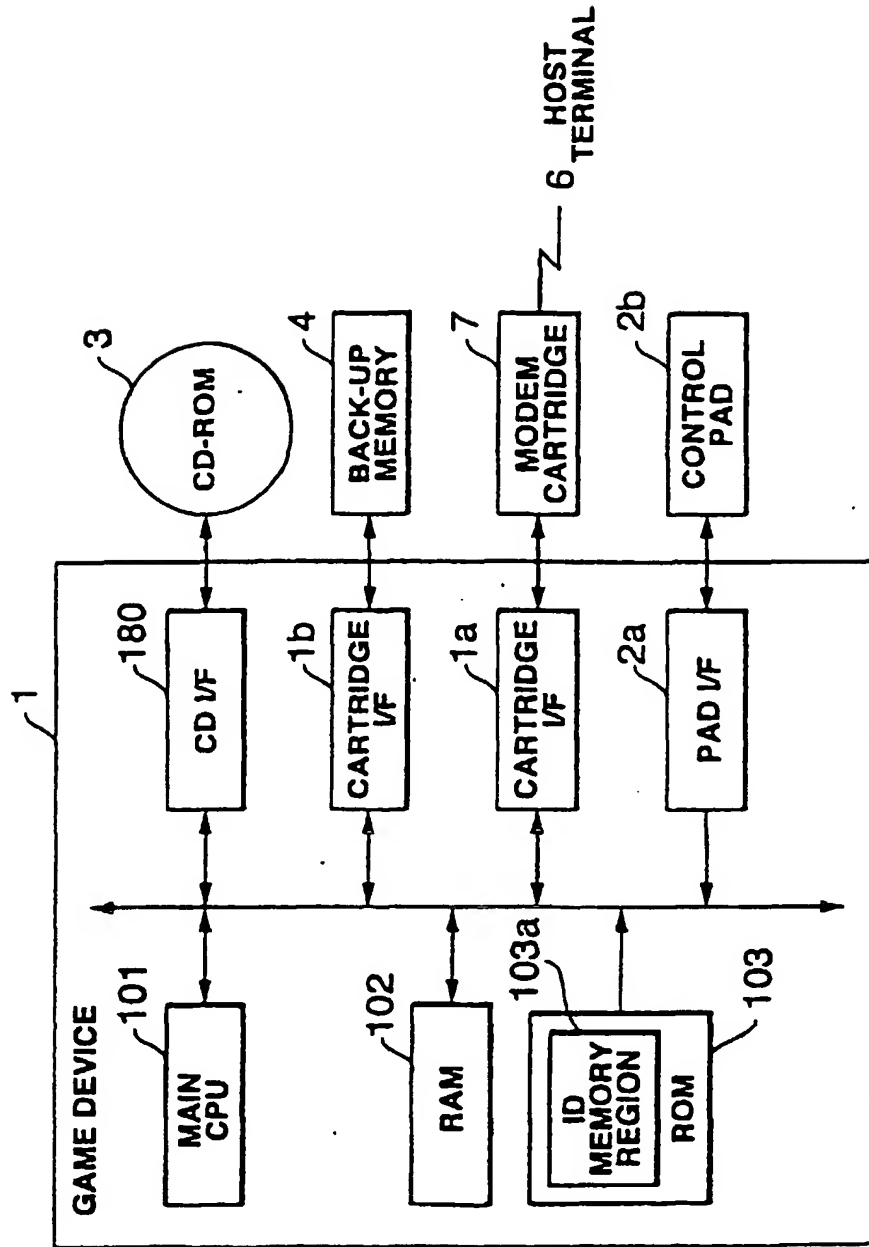


FIG.2

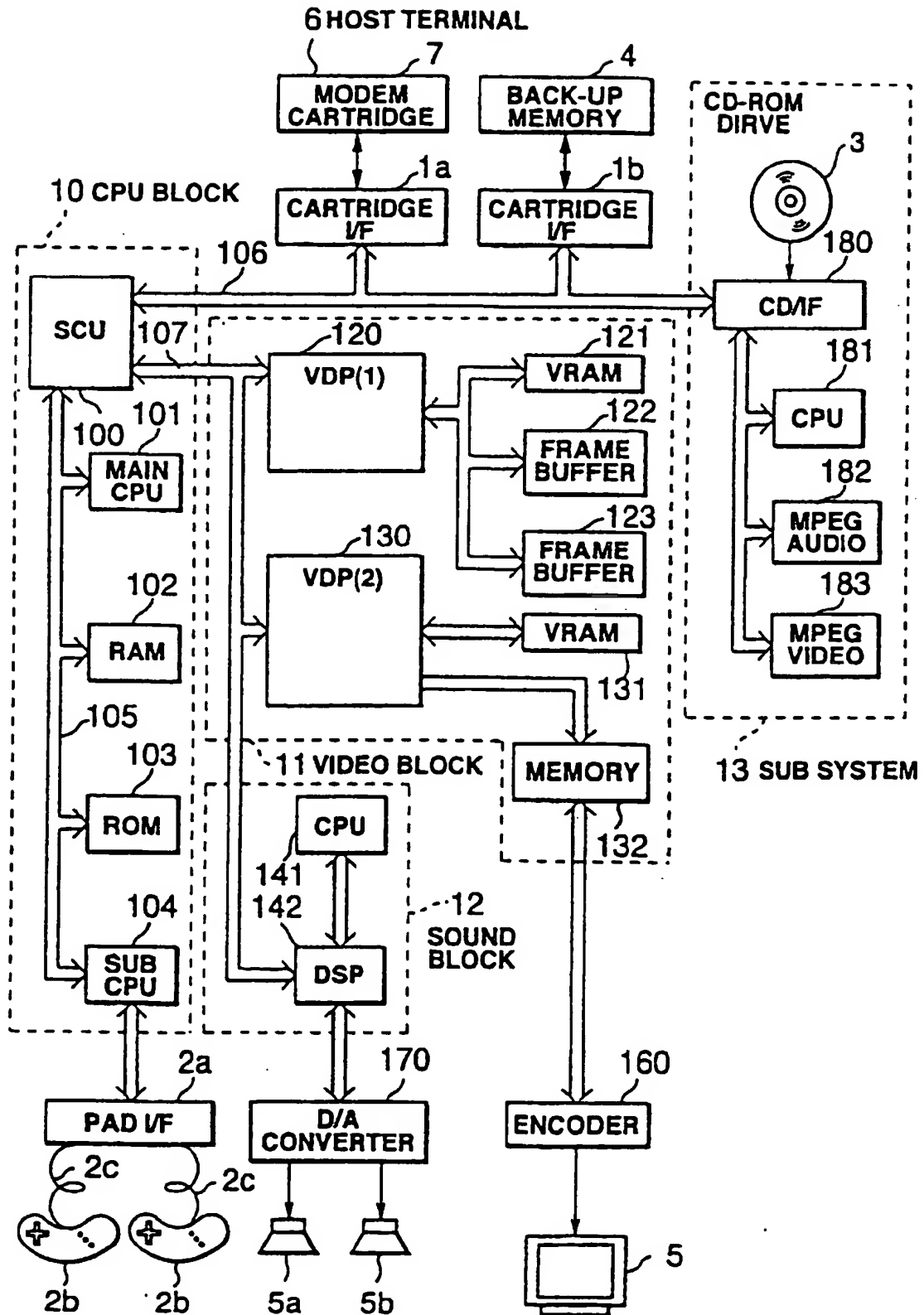


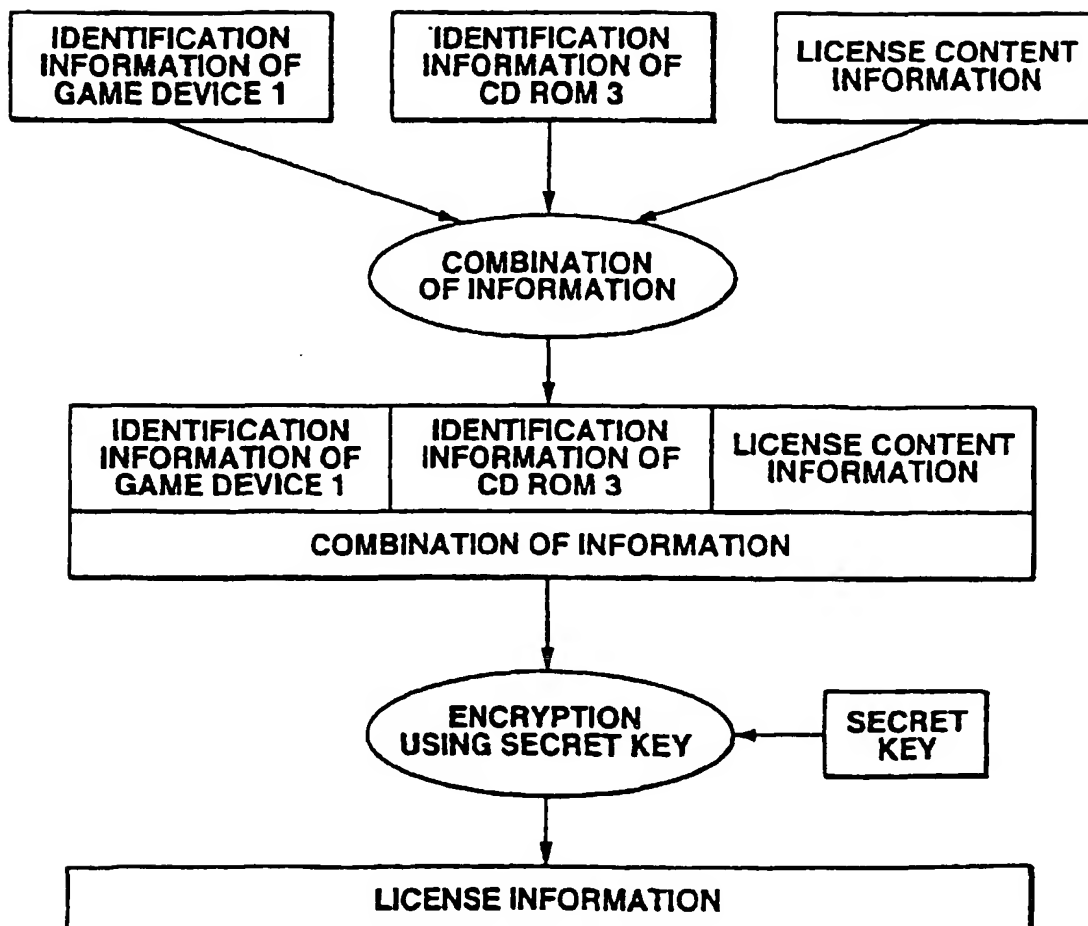
FIG.3

FIG.4

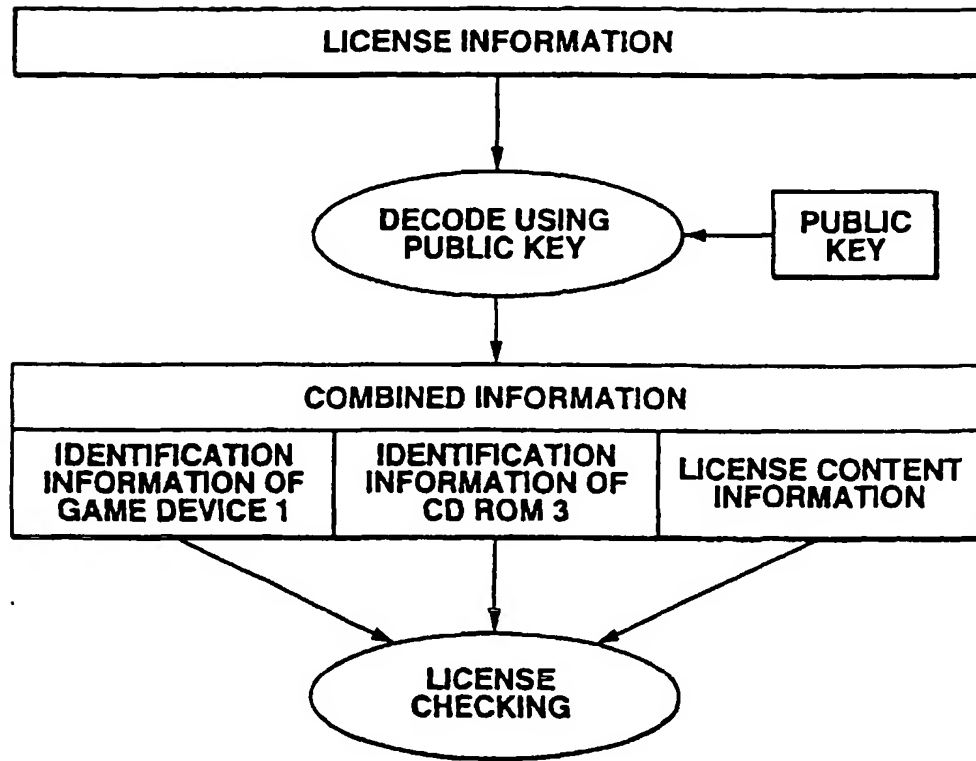


FIG.5

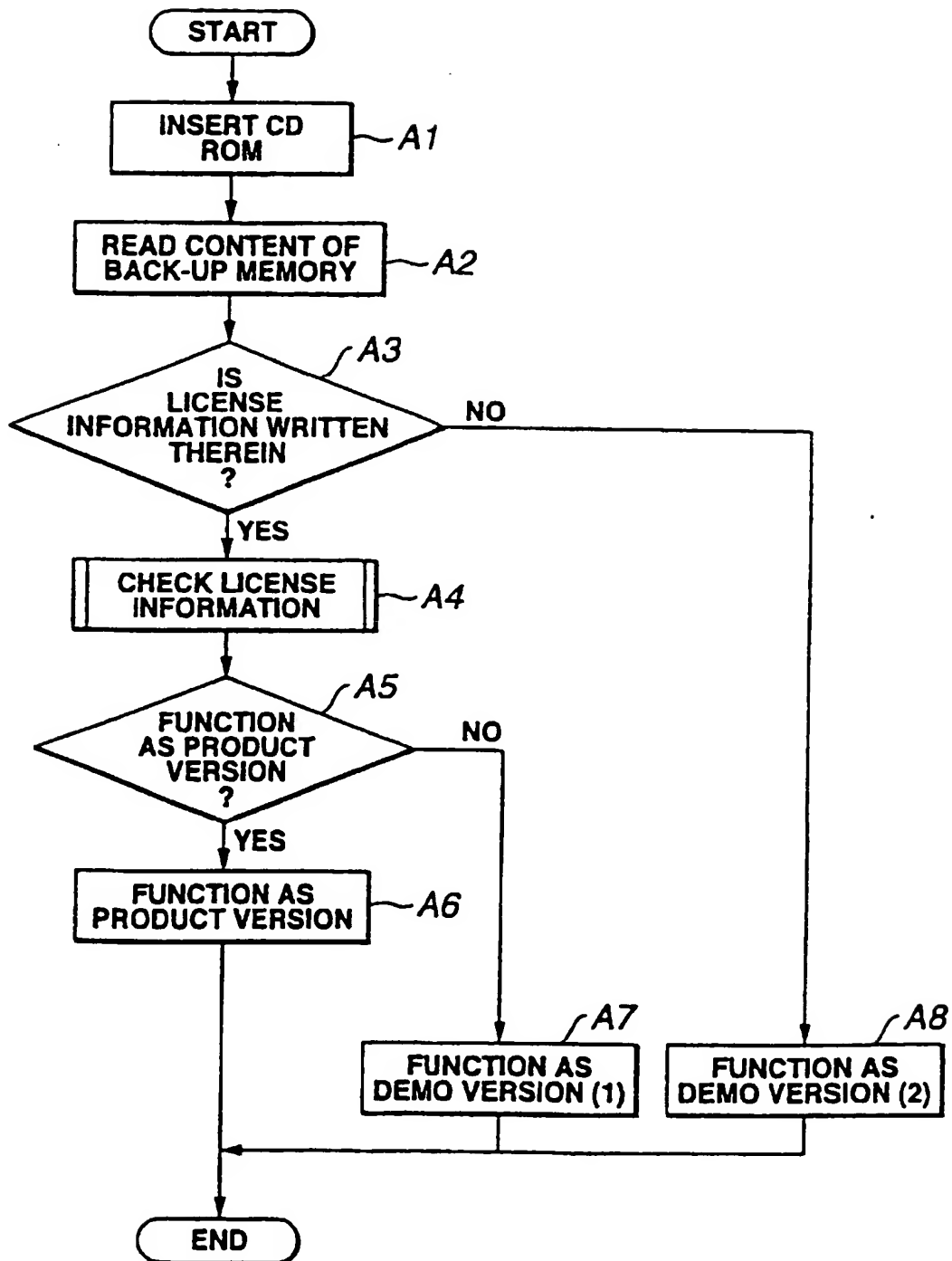


FIG.6

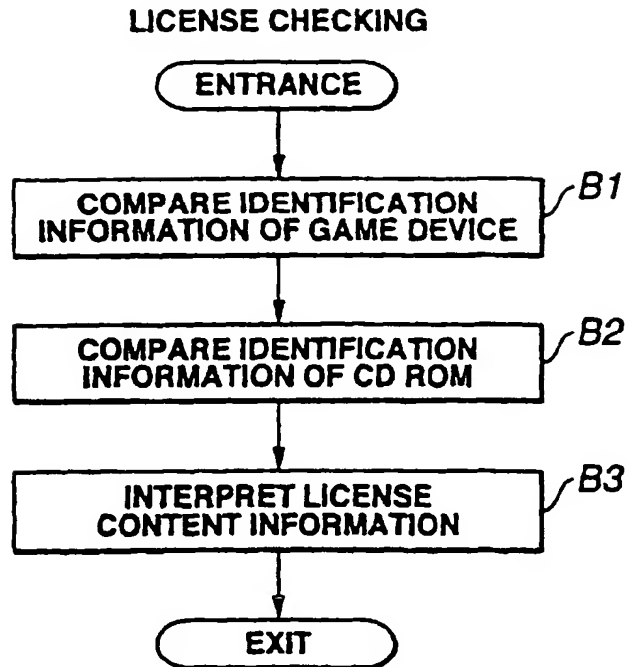


FIG.7

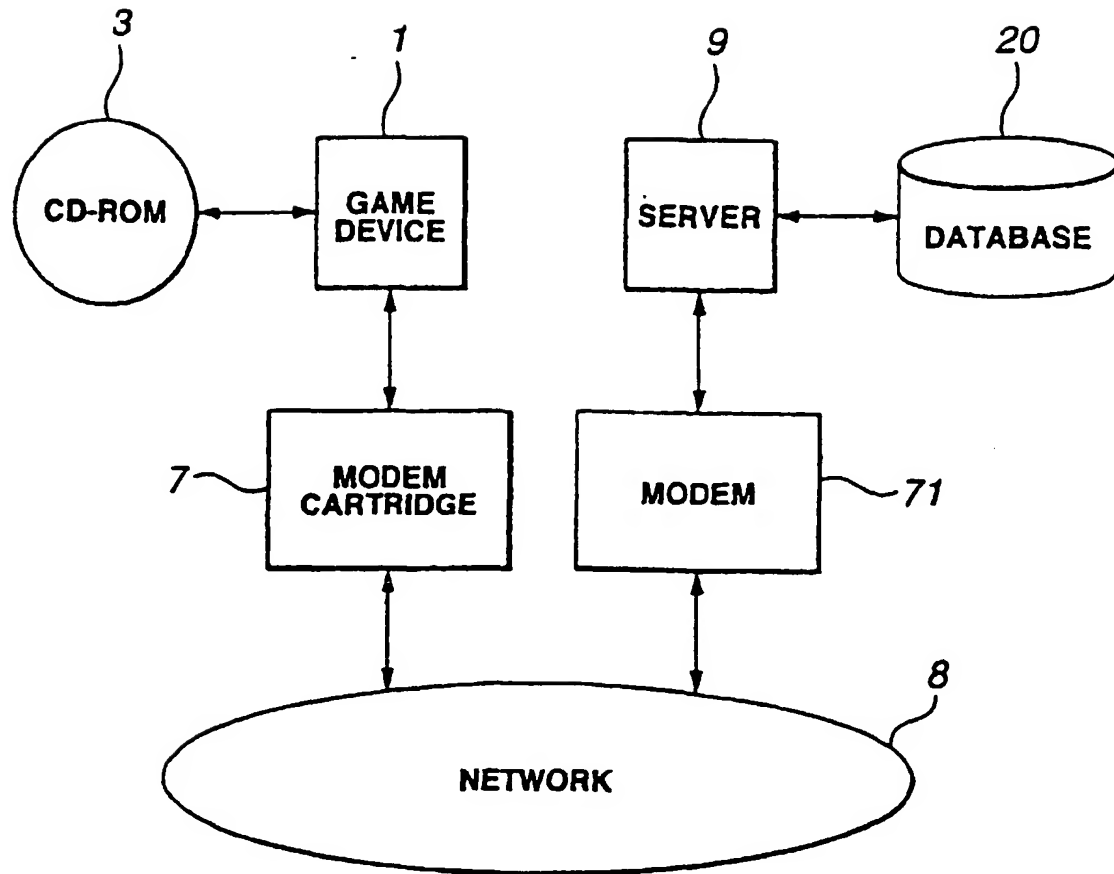


FIG.8

21

| GAME DEVICE ID | SOFTWARE ID | SOFTWARE SN | PLAY DATA |
|-------------------|----------------|----------------|-----------|
| 10100101 | 001011 | 10110111 | XXXXX |
| 11100111 | 110010 | 11000011 | XXXXX |
| 00101101 | 101101 | 10011001 | XXXXX |
| ⋮ | ⋮ | ⋮ | ⋮ |

FIG.9

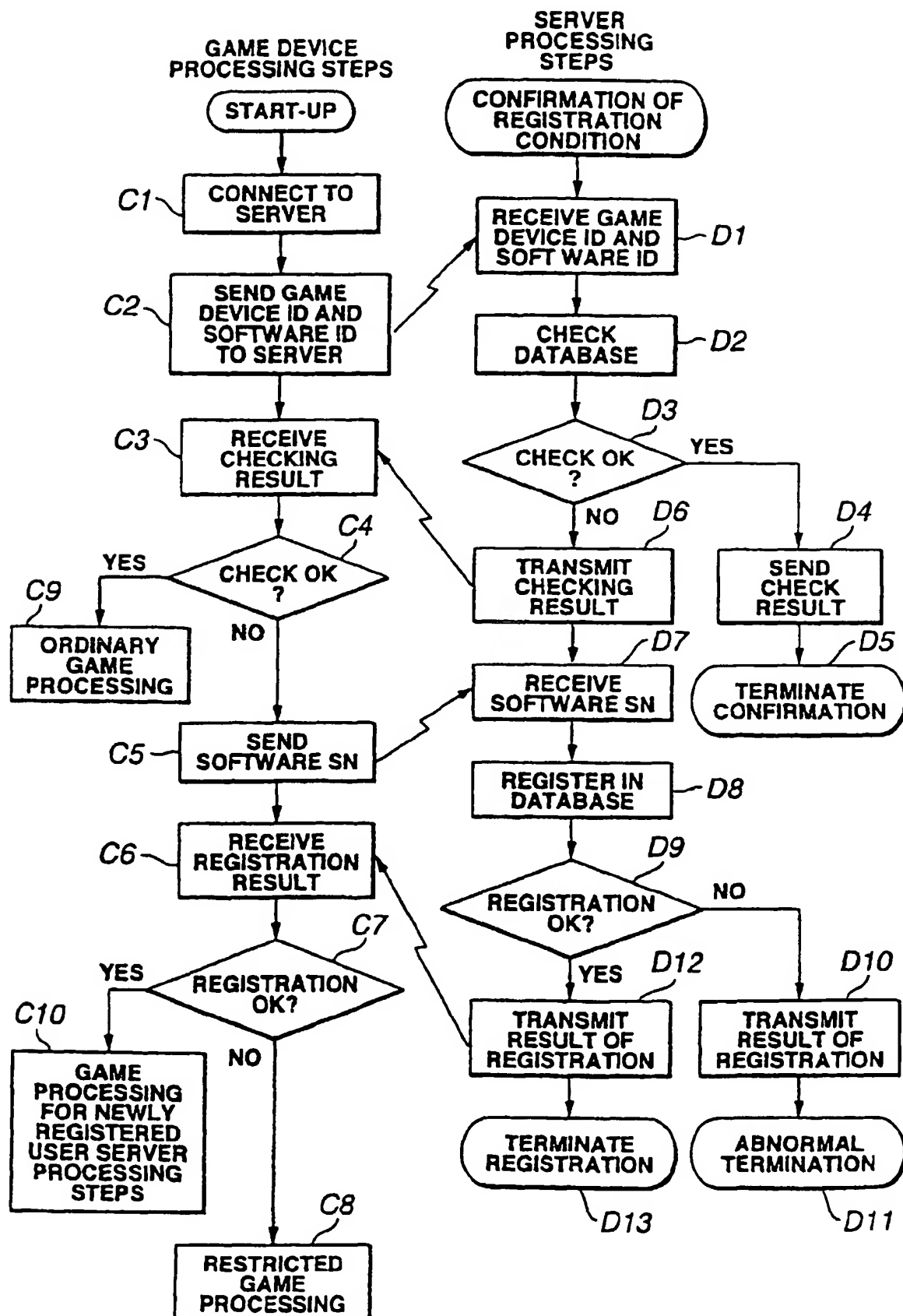


FIG.10

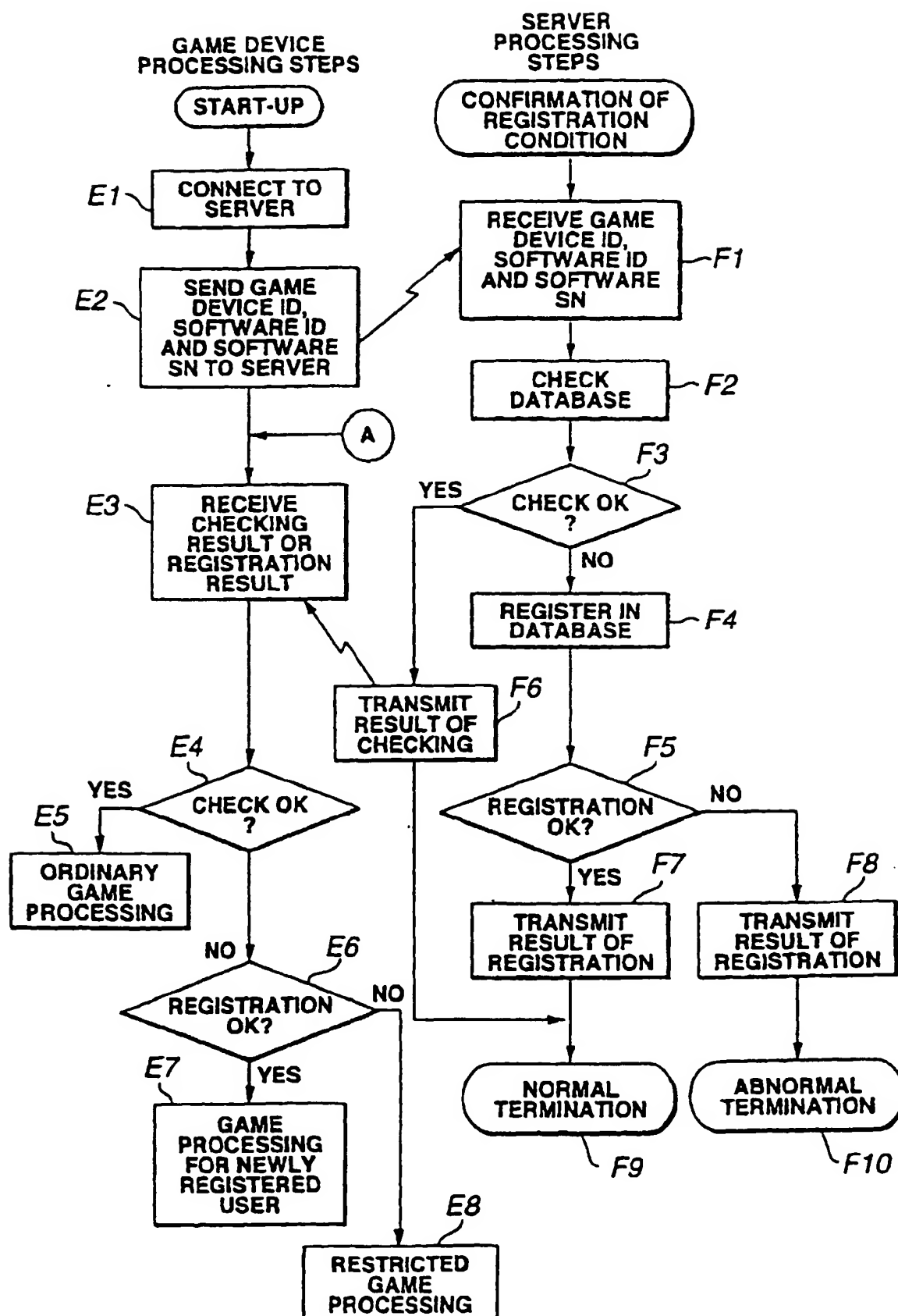
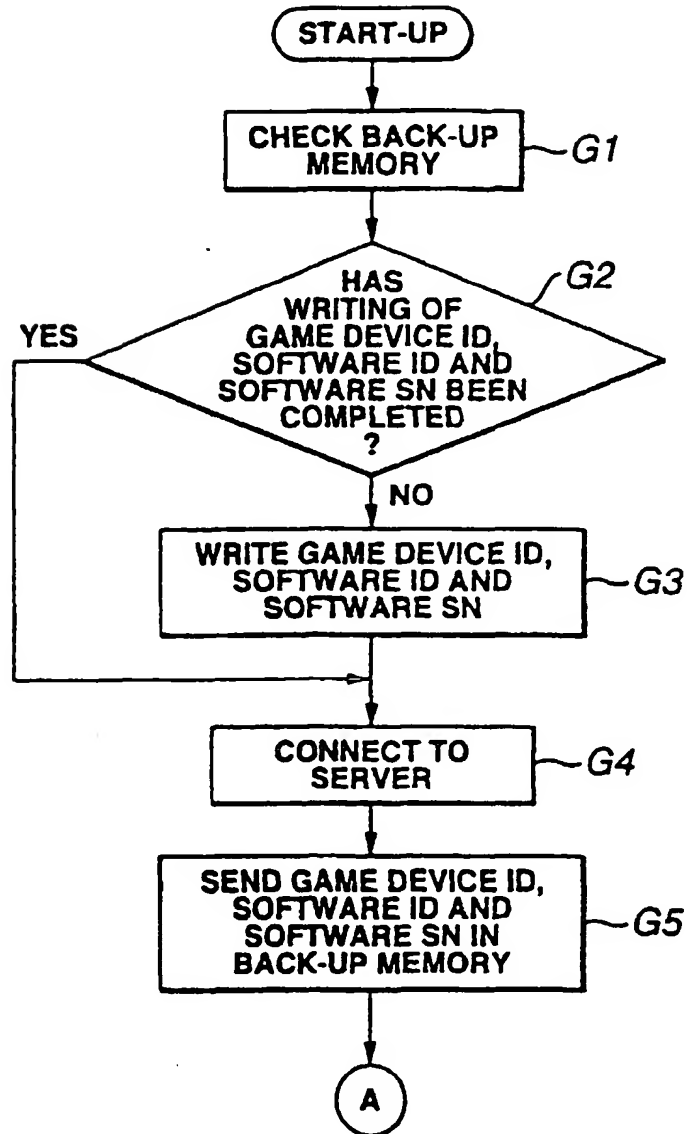


FIG.11**PROCESSING STEPS AT GAME DEVICE**

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP99/02525

| A. CLASSIFICATION OF SUBJECT MATTER Int.Cl ⁶ G06F9/06, 12/14 | | |
|---|---|--|
| According to International Patent Classification (IPC) or to both national classification and IPC | | |
| B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) Int.Cl ⁶ G06F9/06, 12/14 | | |
| Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1922-1996 Toroku Jitsuyo Shinan Koho 1994-1999 Kokai Jitsuyo Shinan Koho 1971-1999 Jitsuyo Shinan Toroku Koho 1996-1999 | | |
| Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) | | |
| C. DOCUMENTS CONSIDERED TO BE RELEVANT | | |
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| X | Technical Paper of the Institute of Electronics and Communication Engineers of Japan, Vol. 94, No. 240 (ISEC-94-18), (Japan), The Institute of Electronics and Communication Engineers of Japan, (21. 09. 94), Pages 41 to 46 | 1-26 |
| X | US, 5341429, A (TestDrive Corporation), 23 August, 1994 (23. 08. 94), Full text ; Figs. 1 to 5 & EP, 601500, A1 & JP, 7-078079, A | 1-26 |
| X | JP, 8-194748, A (Hitachi, Ltd.), 30 July, 1996 (30. 07. 96), Full text ; Figs. 1 to 3 (Family: none) | 1-26 |
| X | US, 5689560, A (International Business Machines Corporation), 18 November, 1997 (18. 11. 97), Full text ; Figs. 1 to 37 & JP, 7-295803, A | 1-26 |
| <input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex. | | |
| * Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed | | "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family |
| Date of the actual completion of the international search 10 August, 1999 (10. 08. 99) | | Date of mailing of the international search report 31 August, 1999 (31. 08. 99) |
| Name and mailing address of the ISA/ Japanese Patent Office | | Authorized officer |
| Facsimile No. | | Telephone No. |

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP99/02525

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|--|-----------------------|
| A | US, 5708709, A (Sun Microsystems Inc.), 13 January, 1998 (13. 01. 98), Full text ; Figs. 1 to 10 & JP, 9-288575, A & EP, 778512, A2 | 1-26 |
| A | US, 5564038, A (International Business Machines Corporation), 8 October, 1996 (08. 10. 96), Full text ; Figs. 1 to 4 & JP, 7-319689, A & EP, 684538, A1 & US, 5771347, A | 1-26 |
| A | US, 4740890, A (Software Concepts Inc.), 26 April, 1988 (26. 04. 88), Full text ; Figs. 1 to 4 (Family: none) | 1-26 |